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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,830	12/21/2000	Il Ryong Park	2658-0250P	6588

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EXAMINER	
CROWELL, ANNA M	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/740,830	PARK, IL RYONG	
	Examiner	Art Unit	
	Michelle Crowell	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-8,10 and 12-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-8,10 and 12-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/23/04 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 4, and 5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites a transfer module for moving the substrate from the etching line to the stripping line **with no exposure of the substrate to air atmosphere**. However, the specification

simply supports a transfer 74 which connects the rinse module 62 with the strip module 64 and includes a pipe shower 76 to prevent the substrate from drying (page 7, lines 2-4), and there is no recitation of the "substrate not being exposed to air atmosphere".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4-8, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532).

Referring to Drawing 1 and paragraphs [0014-[0019], Miyazaki discloses integrated processing apparatus comprising an etch chamber 4 (etching line), stripper 8 (stripping line) and rinse room 11 (cleaning line) on the stripping line.

As seen in Drawing 1 and abstract, an elevator is used to move the wafers from the stripper 8 to the rinse room 11. More specifically, the elevator conveys the wafer from stripper 8 to the storage room 6, to the wafer transfer machine 10, and then to the rinse room 11. The wafer transfer equipment 5 (transfer module) moves the wafers from the etch chamber 4 to the stripper 8 with no exposure of the substrate to air atmosphere.

Regarding claims 4, 5, 8, and 12-14, a load lock chamber 3 (loader) feeds the wafers into the etch chamber 4 (paragraph [0014]). Wafers are sent from the etch chamber to the rinse room 11. After the cleaning process, the wafers are sent to the unloader (paragraph [0019]). Both the loader and the unloader use a conveyor to transfer the wafers (paragraph [0019]).

Miyazaki fails to teach rinsing a substrate after etching and prior to stripping.

Referring to the abstract and Drawing 1, Takeda et al. teaches an etch/strip apparatus including an etch module 2 and a rinse module 4 for etching and rinsing a substrate prior to stripping. By rinsing the substrate after etching, the etchant and etchant residues are washed from the substrate prior to the stripping process. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a rinse module after etching and prior to stripping in order to wash etchant and etchant residues form the substrate prior to the stripping process.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532) as applied to claims 1, 3-9, and 12-14 above, and further in view of Iwai et al. (Japanese Patent Publication 06-224145).

The teachings of Miyazaki in view of Takeda et al. are discussed above.

Miyazaki in view of Takeda et al. fails to specifically teach a pipe shower in the transfer module.

Referring to the abstract, Iwai et al. teaches that it is known to provide a transfer module

13 with a pipe shower 71. By using a pipe shower 71, the transfer module is prevented from reaching high temperatures and films are inhibited from forming on the wafer inside the transfer module. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a pipe shower as taught by Iwai to the apparatus of Miyazaki modified by Takeda et al. This would prevent the transfer module from reaching high temperatures and inhibit films from forming on the wafer inside the transfer module.

7. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532) as applied to claims 1, 3-9, and 12-14 above, and further in view of Toshima (U.S. 6,007,675).

The teachings of Miyazaki in view of Takeda et al. are discussed above.

Miyazaki in view of Takeda et al. fails to teach that the stripping line and the cleaning line are stacked to have a two-tier structure.

Referring to Figure 6a and column 21, lines 40-65, Toshima teaches that it is well known to move wafers from a dry-stripping module 6000 to a wet-cleaning module 7000 using a wafer elevator car 1401 of a wafer elevator 1400. This mechanism, like a robot arm or conveyor, allows the wafers to proceed to next processing module without interruption. In addition, Toshima teaches having a dry-stripping module and a wet-cleaning module stacked in a single system, which saves space and a wafer exchange step, i.e. time, normally used with linear etch/clean systems. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to stack the stripping line with the cleaning line of the apparatus of

Miyazaki modified by Takeda et al. as taught by Toshima. This would allow the wafers to proceed to next processing module without interruption, save time, and reduce the footprint of the equipment.

8. Claims 1, 4, 5, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeOrnellas (U.S. 5,672,239) in view of Toshima (U.S. 6,007,675).

Referring to Figures 1 and 2, and column 3, lines 7-31, DeOrnellas discloses an integrated processing apparatus comprising two etch modules 20 and 22 (etching line), strip module 24 (stripping line) and rinse module 25 (cleaning line) on the stripping line. Load lock chamber 16 (loader) holds the wafers before processing and atmospheric cassette module 34 (unloader) holds the wafers after processing. Furthermore, the atmospheric cassette module 34 contains a robotic wafer handling system 32 (robot) for transferring wafers from a rinsing (cleaning) module 25 to an atmospheric cassette module 34. The vacuum chamber 26 (transfer module) connected to the load lock chamber 16 uses a robotic wafer handling system 38 (robot) for transferring the wafers to the various modules (etching and stripping). Overall, DeOrnellas discloses a closed, unified, and integrated system which performs multiple processing functions (etching, cleaning, and stripping) (col. 2, lines 26-30).

After the wafer is etched, a pre-strip rinse step and spin-dry step takes place in the rinse module 25. This prevents corrosion and the oxidizing of residues into insoluble oxides during photoresist stripping. Likewise after the stripping process, the wafer undergoes a final rinse and dry step (col. 4, lines 5-16).

DeOrnellas fails to teach an elevator for conveying the substrate from the stripping line to

the cleaning line, a pipe shower, and a stripping and etching line stacked in a two-tier structure .

Referring to Figure 6a and column 21, lines 40-65, Toshima teaches that it is well known to move wafers from a dry-stripping module 6000 to a wet-cleaning module 7000 using a wafer elevator car 1401 of a wafer elevator 1400. This mechanism, like a robot arm or conveyor, allows the wafers to proceed to next processing module without interruption. In addition, Toshima teaches having a dry-stripping module and a wet-cleaning module stacked in a single system, which saves space and a wafer exchange step, i.e. time, normally used with linear etch/clean systems. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of DeOrnellas with an elevator and a stacked stripping/cleaning system as taught by Toshima. This would allow the wafers to proceed to next processing module without interruption, save time, and reduce the footprint of the equipment.

Response to Arguments

9. Applicant's arguments filed March 23, 2004 have been fully considered but they are not persuasive.

Applicant has argued that in paragraph [0018] Miyazaki teaches that the wafers are exposed to atmosphere.

Claim 1 recites a transfer module for moving the substrate from the etching line to the stripping line with no exposure of the substrate to air atmosphere. Since paragraph [0015] teaches that the substrates are moved from the etching module 4 to the transfer module 5 to the storage room 6 (transfer module) and then to the stripping module 8 in a vacuum condition

with no exposure to air atmosphere, thus the claimed requirement is satisfied by Miyazaki in view of Takeda. Additionally, in the first line of paragraph [0018], it states that the storage room was in vacuum conditions between the etching and stripping processes. The storage room is not exposed to the atmosphere until after the stripping process. Moreover, there is no support in the specification for the above limitation.

Applicant has argued that the conveyance machine 5 is not a module that provides connectivity between the etching chamber and the ashing chamber.

However, as seen in Drawing 1 of Miyazaki, the conveyance machine 5 is connected between the etch chamber 4 and the ashing chamber 8. Furthermore, claim 1 fails to require that the transfer module is connected between the etching module and the stripping module. Moreover in Figure 3, applicant's etch module 60 is connected to the rinse module 62 and not to the transfer module 72.

Applicant has argued that Takeda teaches away from preventing the substrate from drying.

However, Takeda et al. was applied to simply teach a rinsing operation occurring between the etching and stripping operation. The transfer module of Miyazaki fails to include a heater, and thus the combination of Miyazaki in view of Takeda et al. satisfies the claimed requirement of a transfer module for moving the substrate from the etching line to the stripping line while preventing the substrate from drying.

Applicant has argued that DeOrnellas fail to teach a transfer module for moving the substrate from the etching line to the stripping line with no exposure of the substrate to air atmosphere.

As seen in Drawing 1 and column 3, lines 8-12, the modules are connected to vacuum chamber 26 in a closed environment. Additionally, the specification fails to support the limitation of the substrate not being exposed to air atmosphere.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:00 - 5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC
03-31-04

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